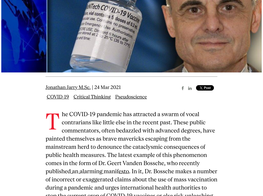
The Doomsday Prophecy of Dr. Geert Vanden Bossche

A Belgian virus expert has scared the Internet by claiming the COVID-19 vaccines will doom humanity. No need to panic.



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COVID-19 | Critical Thinking | Pseudoscience

The COVID-19 pandemic has attracted a swarm of vocal contrarians like little else in the recent past. These public commentators, often bedazzled with advanced degrees, have painted themselves as brave mavericks escaping from the mainstream herd to denounce the cataclysmic consequences of public health measures. The latest example of this phenomenon comes in the form of Dr. Geert Vanden Bossche, who recently published an alarming manifesto. In it, Dr. Bossche makes a number of incorrect or exaggerated claims about the use of mass vaccination during a pandemic and urges international health authorities to stop the current crop of COVID-19 vaccines or else risk unleashing "a global catastrophe without equal." This is scary stuff, but it's all quite misguided.

Analogies break down in the face of data

Dr. Bossche asserts that vaccines are like antibiotics in that, when they are both overused and imperfect, they allow germs to mutate in dangerous ways. With antibiotic use, the bacteria that have developed a mutation or acquired a gene that gives them protection from the antibiotic will escape death and soon become the dominant strain. That's antibiotic resistance. Bossche then claims that the same thing will happen with the coronavirus. Because, he says, the vaccines are imperfect, they will allow the virus to keep being transmitted from person to person and thus mutate inside of us, until a dangerous new variant emerges.

This is not complete nonsense. I reached out to Dr. Paul Offit, a paediatrician specialized in vaccines and immunology and the co-inventor of the rotavirus vaccine, to get his thoughts on whether antibiotic resistance and vaccine-associated immune escape are indeed comparable. "In a sense it is, but he misses the main point," Dr. Offit told me. A vaccine shows your body an inert part of the virus so that it can make neutralizing antibodies against it. If the body ends up making low levels of these antibodies, i.e. not enough to swiftly kill the virus when you catch it, this could allow the virus to stick around in your body for a little bit and make copies of itself. Some of these copies may by chance have the right kinds of errors in their genetic code to become variants of concern, although the mutation rate of this coronavirus is quite low.

"But if you have a vaccine that results in high levels of neutralizing antibodies, that's not a way to create variants," he continued. To use an analogy, if a gaggle of invaders is coming but you have only managed to round up a few soldiers, be prepared for a long siege during which the enemy might learn a thing or two about your defences and adapt. But if you have a full and overpowering army at your command, the invaders won't stick around for long. So the question becomes: do the COVID-19 vaccines give us low or high levels of neutralizing antibodies?

While scientists don't yet know exactly what levels of antibodies are needed to ward off disease, the approved vaccines do elicit the production of neutralizing antibodies. Meanwhile, a small study published in *The Lancet* showed that giving people who had never had COVID-19 a single dose of the Pfizer-BioNTech vaccine resulted in them making similar levels of anti-spike protein antibodies as individuals who had had COVID-19 but had not yet been vaccinated. A study of the Moderna vaccine in 34 participants showed "high levels of binding and neutralizing antibodies that declined slightly over time, as expected, but [that] remained elevated in all participants three months after the booster vaccination." More broadly, data from the vaccine-clinical trials and from countries that have vaccinated a large percentage of their population show a significant reduction in cases and mortality. The vaccines are working.

But what about asymptomatic transmission? Many vaccines prevent transmission of the virus from person to person, and there is mounting evidence that the COVID-19 vaccines do as well. Even if they don't prevent all transmissions, it looks like they can dramatically cut the transmission chain and also reduce the amount of virus that can be transmitted in these cases. Dr. Bossche's idea that the coronavirus will simply continue moving from person to person and that vaccines will only prevent severe disease is contradicted by the data that is accumulating.

But even if the COVID-19 vaccines were "leaky," meaning they still allowed some vaccinated people to transmit the virus to others, there is evidence that they could still efficiently contain the spread of the disease. Edward Nieuwenhuys, a science blogger who addressed Dr. Bossche's claims in great detail, points to Marek's disease. It is caused by a herpesvirus and it gives chickens a number of health problems, including cancer. Thankfully, there is a vaccine against it, but over time, newer and more virulent strains of the virus have been detected, and this made scientists think it was because the vaccine was leaky, that it did not allow the chicken to mount a good enough immune response. Interestingly enough, the use of this seemingly leaky vaccine in chickens led to a reduction in the incidence of Marek's disease by 99%. Potentially leaky vaccine but stellar disease reduction.

Another important counterpoint to Dr. Bossche's claim is that we can simply reformulate our vaccines to match new variants of concern. There is a reason why a new flu vaccine is made each year: the influenza virus drifts and shifts and the vaccine needs to be reformulated to be a better match for the specific viruses that are predicted to be common during the next flu season. Similarly, if a new SARS-CoV-2 variant emerges and is so different that our current crop of vaccines don't match it, scientists can simply tweak their vaccines. It's not an instantaneous solution, as massive vaccination campaigns require manufacturing and deployment at scale, but it's a fix we know well and have implemented in the past.

And lest we forget: the variants of concern making headlines right now *before* we had any vaccine against the coronavirus. Dr. Bossche's concern about imperfect vaccines allowing the virus to mutate should be dwarfed by the much larger, evidence-based worry of allowing the virus to mutate inside of unvaccinated people. Without vaccines, the virus is allowed to jump from person to person and make imperfect copies of itself, and this flawed replication process is like a worldwide game of Russian roulette. Most times, the virus will not mutate or its mutation will be harmless, but the more people incubate the virus, the bigger the chance of a dangerous mutation emerging by chance. Vaccines can put a stop to that.

If Dr. Bossche fears the current vaccines so much, what is his solution?

The innate immunity gambit

Our immune system is divided into two main branches: innate and adaptive. Basically, innate immunity is a bit like Dory the amnesiac fish from *Finding Nemo*. It doesn't remember much. You can throw the same virus at your innate immune system and it will not remember it. It will not get any stronger fighting it each time. By comparison, the adaptive immune system has a memory built in. It remembers tiny invaders and fights them back with more vigour each time. Vaccines make use of the adaptive part of our immune system.

Dr. Bossche, however, seems to be a big fan of the innate immune system and he worries that all of these COVID-19 vaccines and public health measures are getting in the way of our innate immune system fighting off the coronavirus. In claims that keeping people in lockdown during the pandemic is not beneficial to their innate immune system, which requires exposure to viruses and bacteria to remain in tip-top shape. This is a bad argument. As Dr. Offit pointed out to me, even at home we are exposed to legions of microorganisms. "The food you eat isn't sterile," he reminded me, "the dust you inhale isn't sterile, the water you drink isn't sterile." We get exposed to a lot of microorganisms.

This innate immunity gambit on the part of Dr. Bossche is something typically seen in wellness communities obsessed with the naturalistic fallacy, where strengthening your immune system is as simple and as natural as taking in the sun, walking in the woods, and hugging people. For Dr. Bossche, however, the solution is not long walks on the beach, but an alleged new type of vaccine focused on training the innate immune system. One of the cell types of the innate immune system is a natural killer cell, and Dr. Bossche claims to be developing a natural killer cell vaccine. Have we seen any evidence of this? No. I believe I speak for many scientists when I say: show us the evidence.

Imagine you were a public health adviser and were confronted with this choice: to heed Dr. Bossche's apocalyptic warning and stop all COVID-19 vaccinations (scenario #1) or to ignore him and follow the evidence (scenario #2). What would you do?

In scenario #1, you get rid of vaccines and lockdowns and allow the virus to spread, practically unimpeded, through the population, killing more and more people and leaving many with long-term health consequences. As the virus spreads, it mutates here and there and new variants of concern emerge. And maybe, at some point, Dr. Bossche validates a new kind of vaccine that works in a completely different way and it eventually allows us to curb the pandemic. Maybe.

In scenario #2, we vaccinate as many people as we can and as quickly as we can. Cases and deaths go down. If new variants of concern that escape from the protection granted by the vaccines emerge, scientists reformulate the vaccines. This strategy is based on vaccines that target the adaptive arm of our immune system, the same principle that allowed us to slay smallpox and bring polio and measles down to their knees.

I know which scenario I would choose.

Pattern recognition

Finally, a few words on Dr. Bossche himself and the rhetorical tricks he uses in his manifesto. I am sometimes accused of attacking the person instead of simply addressing the arguments, but appraising the messenger and the phrasing of the message can be very useful.

Dr. Geert Vanden Bossche is a veterinary doctor who also has a Ph.D. in virology. His LinkedIn profile lists several jobs in upper management positions, including a three-year stint as the senior program officer for vaccine discovery at the Bill and Melinda Gates Foundation. He is no stranger to vaccines. His academic publications essentially stop in 1995, except for one 2017 article about his natural killer cell vaccine idea published in a journal belonging to a publishing group, OMICS Group Inc., that has been called "predatory" and was sued by the Federal Trade Commission for deceptive practices.

When you read Dr. Bossche's open letter, you should pick up on the Galileo gambit, which is when you infer that because Galileo was laughed at but ultimately correct, your laughable idea must also be correct. You should pick up on his apocalyptic language ("there is no time to spare", "if we are committed to perpetuating our species") and turns of phrases that would be more at home in a superhero movie ("guardians of mankind"). You should pick up on the tactic too often used by anti-vaccination promoters: "I am not but an antivaxxer." You should subsequently pick up on the types of people who grab this manifesto and endorse it for their audience, people like Robert F. Kennedy, Jr and Del Bigtree, known figureheads of the modern anti-vaccination movement.

And if you have been at this for a while, like Dr. David Gorski who has followed and denounced the anti-vaccination movement since time immemorial, you may even pick up on similarities with the disgraced Andrew Wakefield. "Dr. Vanden Bossche is using an eerily similar argument about COVID-19 vaccines and SARS-CoV-2," he writes for the blog *Science-Based Medicine*, "to the one used by Wakefield about [the measles-mumps-rubella] vaccine and measles. Actually, it's not just eerily similar, it's almost exactly the same, namely that immunity from vaccines is an evolutionary selective pressure just like the evolutionary selective pressure from antibiotics to which the organism can become resistant."

In short, if we are concerned about the virus mutating to evade vaccine protection, the solution is to vaccinate as many people as quickly as possible and to eventually reformulate the vaccines to match variants of concern that acquire this ability. And if we are concerned about the anti-vaccination movement, we should wonder why they were so quick to prop up the portentous letter of an alleged pro-vaccine scientist.

Take-home message:

- Dr. Geert Vanden Bossche is a veterinarian who recently released an open letter boldly claiming that the COVID-19 vaccines will be harmful to humanity by allowing the virus to mutate in dangerous ways
- If we are worried about dangerous variants emerging, it is much riskier to allow the virus to spread between unvaccinated people
- If coronavirus variants emerge for which the current vaccines offer little to no protection, the vaccines can be reformulated to be a better fit, much like the annual flu vaccine
- Dr. Bossche proposes the use of a new type of vaccine based on natural killer cells, which he claims he is working on but for which there is no published evidence

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